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The

# Electro-Therapeutic Guide

WM. F. HOWE, M. D.

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# The Electro-Therapeutic Guide.

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NATIONAL ASSOCIATION OF ELECTRO-THERAPEUTISTS.

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## Preface to The First Edition.

This little work is intended as a guide or aid to the correct use of electricity in the hands of the general practitioner.

A physician who is obliged to cover the entire field of medical and surgical practice cannot be expected to keep in mind all the little details of Electro-Therapeutic practice.

The Guide has been arranged in this form that a busy practitioner may see at a glance the methods of application in any desired case.

We believe that this guide will save much time and insure a more scientific and successful use of electricity in the hands of the average physician.

In following out the treatments outlined in this work any intelligent physician will take into consideration the age and sex of the patient, individual idiosyncracies, etc.

No originality is claimed by the author in the methods of treatments given. The general rules given and the methods of treatment advised are in accord with the best Electro-Therapeutists.

It is believed, however, that this is the first attempt to so thoroughly simplify and condense Electro-Therapeutic applications as to enable the busiest of general practitioners to ascertain without unnecessary study and loss of time how

to make the correct application in the class of cases coming to the average physician.

It is not expected that this work will take the place of a text book of Electro-Therapeutics or a lecture course upon this subject.

This work is not written for the specialist in Electro-Therapeutics, but for the general practitioner with but limited knowledge on the subject.

W. F. H.

## **Preface to The Third Edition.**

The first two editions of this little work have met with such favor from the medical profession that a third edition becomes necessary.

Some changes have been made, particularly in the chart form, which it is hoped will be approved by the profession.

Hundreds of physicians who would not have devoted their time to a thorough study of Electro-Therapeutics from a large text book, and who could not have taken a post graduate course in this subject have, with the aid of this Guide, been enabled to apply electricity in a thoroughly scientific and successful manner and have secured results

which would have been impossible without the knowledge therein contained.

If this little work will assist the busy practitioner and guide him to proper methods of applying electricity in diseased conditions, securing results that would otherwise have been failures; and if it will interest him in the subject of Electro-Therapeutics and stimulate his desire for knowledge along this line and cause him to give more attention to this important branch of medical practice, the author will be satisfied.

W. F. H.

## The Faradic or Interrupted Current.

The Faradic current is so called from its discoverer, Faraday. It is produced by means of a double coil of wire through the larger or primary coil of which passes an interrupted galvanic current. One to three cells give sufficient current.

A good dry cell is most satisfactory for a portable Faradic machine, while some form of the LeClanché fluid cell is preferable for office use. The dry cell is not so expensive in Faradic batteries, as only from one to three are used at a time.

This current acts more markedly upon the muscular system.

It produces muscular contractions more readily than the galvanic current. It also produces greater mechanical effects.

The strength of current is regulated by the sensibility of the patient.

The Primary Coil of the Faradic battery gives more a current of quantity than intensity, i. e., the current lacks ten-



sion and power of penetration but will produce more powerful superficial muscular contractions than the secondary current.

The primary coil produces a current that is more stimulating and irritating than the secondary coil, hence the primary coil would be used in affecting capillary circulation, in producing powerful muscular contractions and in stimulating a paralyzed nerve if near enough the surface to be reached by the primary current.

In the current from the primary coil the positive pole is more sedative and the negative more stimulating in its effect.

The principle differences in the primary and secondary currents are as follows:—

The secondary current is an alternating current of high tension or voltage, and low quantity or amperage. It is an induced current which is caused to flow as an alternating current by the action of the interrupted galvanic, through the primary around the soft iron core. The number of alterations depends upon the number of vibrations of the iron hammer; or, rather, as stated before, the number of interruptions of the galvanic current.

The primary current more nearly resembles the galvanic. It is a current of usually lower intensity or voltage,

and higher quantity of amperage.

The Secondary Coil produces an induced current having greater tension and penetration and sedation than the primary coil, and is of greater service in treating diseases of the nerves or any deeply seated condition.

The current from the secondary coil is pleasanter and less pain is felt when strong currents are used than in the primary.

In the secondary current there is no difference in effect between the positive and negative.

In using the Faradic current—either primary or secondary coil—it is safe to use as strong a current as the patient can take without pain or unpleasantness.

The number of interruptions per minute in the Faradic battery—any coil being used—can be varied by adjusting the screw which regulates the vibrator.

With a comparatively small number of vibrations the current would have greater power to produce muscular contractions, it would be more plainly felt, would cause greater pain if a strong current was used and would be more irritating and stimulating in its effect. The greater number of vibrations per minute the less pain is experienced, less powerful muscular contractions and greater sedation.

## Effects of The Different Currents.

Some of the points of advantage of the Faradic battery are—that it is smaller and more portable; the current is much more plainly felt, and is more pleasant to the average patient, and the sensations are such as to cause greater confidence in the treatment and appreciation of the effects than with the galvanic current, where little, if any, sensation is produced and where the patients frequently insist they are receiving no current, even though a moderately strong current is passing.

The Faradic battery can be more easily carried by the country physician. Some of the advantages of the effects of treatment of the Faradic over the galvanic current are, it produces muscular contractions more readily, produces greater mechanical effects, stimulates the circulation more powerfully and is less likely to produce an aggravation in the treatment of disease if improperly used. In the Faradic current there is very little, if any, chemical effect, and electrolysis or cataphoresis cannot be secured.

There are very many points of similarity in the effects of the two currents and many conditions can be successfully treated with either current. This will be referred to later.

There is but little trouble in keeping a Faradic battery in working order. When purchased, directions accompany them for the proper starting of the current, the fluid to be used, if it is a liquid battery, etc. Care should be taken that the contents of the cells are not spilled upon the battery. If the contact points become corroded or rusty it interferes with the current. The vibrator spring should always be kept clean, any dust or grease frequently stopping the current.

### **The Galvanic Current.**

This current produces no sensation beyond a slight feeling of heat or burning beneath the negative electrode and a slight numb sensation beneath the positive electrode.

In those peculiarly susceptible or afraid electricity will hurt them the galvanic current can be used where the Faradic would not be tolerated.

The Galvanic current has greater power of penetration and sedation than the Faradic current, no matter which coil is used in the latter.

In the Galvanic current the positive pole is, to a marked degree, more sedative in its effect and the negative pole more stimulating and irritating.

The Galvanic current produces a chemical effect in the tissue and can be used to produce electrolysis, cataphoresis, etc., while this is not true of the Faradic current. The positive pole attracts oxygen and the acids. The negative pole attracts hydrogen and alkalies.

The Galvanic current has a greater effect upon nutrition and will stimulate the absorbents and assist in removing hypertrophies, effusions and morbid growths where the Faradic current would be useless.

The Galvanic is the only current that can be used in removing superfluous hairs, facial blemishes, hemorrhoids, arethral stricture or wherever the process of electrolysis or cataphoresis is to be employed.

The Galvanic current affects the nervous system more profoundly than the Faradic. It will also, by reversals of the current direction, cause muscular contractions in some cases where the Faradic current fails. It produces greater molecular changes in the tissues and possesses a greater catalytic action.

The Interrupted Galvanic current is used where it is desired to produce strong mechanical effects. The slower the interruptions the more vigorous will be the muscular contractions. In some chronic and exceedingly obstinate

cases where the Faradic current has little, if any, effect the interrupted Galvanic current will produce the desired result.

The interrupted current has greater stimulation and irritation than the direct current. The interrupted Galvanic current is the most useful in treating obstinate cases of rheumatism, muscular atrophy, local anesthesia, paralytic conditions and a similar line of diseases.

The interrupted current is of decided advantage in a certain range of conditions, but is used but rarely as compared with the direct.

The Milliampere Meter measures the strength of the current in transit through the body.

Two to four milliamperes are sufficient over the forehead, around the eyes, upon the face, or over any delicate or sensitive part.

Upon the spinal cord from five to twenty milliamperes may be used, and over the stomach, abdomen, thighs, etc. from fifteen to fifty, while in dispersing fibroid tumors it will be necessary to employ from one hundred and fifty to two hundred and fifty.

The milliampere meter can only be used with the Galvanic current.

If one does not have a meter and is obliged to depend

entirely upon the number of cells being used as a guide to current strength it may be stated that one to three cells of the ordinary battery would be considered a mild current and would be sufficient over the eyes, forehead, or other sensitive parts. From two to ten cells might be employed upon the spinal cord; five to ten cells upon the limbs or abdomen where there is little adipose tissue, and from six to fifteen cells where there is much resistance to overcome in corpulent patients. In the treatment of fibroid tumors it will be necessary to employ from twenty to forty cells.

The Rheostat or Current Controller interposes a resistance in the passage of the current and by increasing and decreasing the resistance by the aid of the Rheostat the Galvanic current can be applied without any shock to the nerves, which is unavoidable without the use of the Rheostat. This instrument is placed in the circuit, usually attached to the battery, and by its aid the current can be applied so as to begin treatment with almost no perceptible current. In using the Galvanic current the treatment should be commenced with a very mild current gradually increased to the desired point, and then decreased before the electrode is removed.

In using strong Galvanic currents it is essential that the

current is not abruptly broken. The Rheostat or Current Controller is the only successful and convenient method of regulating the strength of the current.

## Battery Cells.

The bichromate of potash solution is the one most frequently used in portable fluid batteries and is prepared in the following proportions, although this may be varied:

Sulphuric Acid.

Bi-Chromate of Potash aa 1 ounce.

Aqua 12 ounces.

To prepare this mixture, add the sulphuric acid to the water and when cool add the Bi-chromate of Potash.

The elements are usually carbon and zinc and should not be immersed in the fluid until same is cool—when not in use the elements should always be removed from the battery fluid.

Where the elements are platinum and carbon the fluid is usually sulphuric acid and water in the proportion of one to ten or twelve.

The Sal Ammoniac solution is used in many of the stationary office batteries, and makes one of the most constant and reliable batteries known. Four to five ounces of



muriate of ammonia are placed in each cell and enough water to two-thirds fill the jar. The elements are carbon and zinc and these may be left immersed in the fluid when the battery is not in use. This cell is too large to be used in portable batteries.

The ordinary dry cell is satisfactory for a portable Faradic battery, but is too short lived and expensive and unreliable for Galvanic work.

The Chloride of Silver Cell makes an excellent battery either Faradic or Galvanic; portable or stationary.

## Electrodes.

The surface of electrodes for ordinary external work should be of carbon or of metal, nickel plated. For general use these should be covered with sponge or absorbent cotton. The latter is the more cleanly and should be used oftener than it is.

In the accompanying chart where the sponge electrode has been specified, the cotton-covered electrode could be used with equal advantage. The sponge electrode is named as it is in more common use.

If it is desired to treat a single muscle or nerve a very

small electrode must be used to localize the current upon the one point.

Vaginal, uterine, urethral and rectal electrode should be made of metal (preferably brass) and nickle plated. Block tin and aluminum are used by some. Where it is desired to have an electrode cover considerable surface for using strong currents the clay electrode of Apostoli may be used or a sheet of zinc covered with a heavy moist towel and adjusted to come in contact with the entire surface which it covers.

The Wire-Brush Electrode is used as a counter irritant or where there is local paralysis or anaesthesia as it will more powerfully stimulate and irritate the parts than a sponge electrode.

For general faradization or galvanization it is advisable to use a sponge electrode from four to six inches in diameter to cover as large an area as possible. Large electrodes should be used whenever it is desired to use a strong current with the smallest possible pain or burning.

We give here the meaning of a few words and phrases with which the physician should be familiar.

Ampere—The unit of quantity.

Anode—Positive Pole.

Anelectrotonos—A condition of diminished irritability produced by the positive pole.

Ascending Current—Flowing from periphery to center. The current flows from positive to negative pole.

Catalysis—The absorption and transference of liquids caused by the chemical action of the galvanic current.

Cataphoresis—The introduction of medicines into the body by the aid of electricity.

Cataelectrotonos—A condition of increased irritability produced at negative pole.

Cathode—Negative Pole.

Commutator—Current reverser.

Constant current—Galvanic current.

Density of current—The density of current—other things being the same—is in proportion to the small size of the electrode.

Descending current—Flowing from center to periphery.

Electrization—This term includes galvanization, faradization and franklinization.

Electrolysis—Electro—chemical decomposition. The process of decomposing a substance.

Electro-motive force—The pressure of current.

Electro-puncture—The application of electricity by needles. introduced beneath the surface.

Electro-Therapeutics—The application of electricity to the treatment of disease.

Electrotonos—The peculiar modification of irritability which nerves and muscles undergo when acted upon by a galvanic current.

Faradic current—Named after the discoverer Faraday. Also called the induced, interrupted, secondary, to and fro, indirect, electro-magnetic and magneto-electric.

Farad—The unit of capacity.

Faradization—Application of the Faradic current.

Franklinism—Static electricity.

Galvanic current—(Named after Galvani) a current coming directly from the battery (not induced by a coil of wire) called also the continuous, constant, direct, voltaic current.

Galvano—Faradization—The simultaneous use of the two currents.

Helix—The coil of wires of the electro-magnetic battery.

Labile Application—Where the active electrode is

passed over the surface instead of being kept in one position.

Ohm—The unit of resistance.

Poles—Points where the electricity is concentrated or passes in and out. Positive and Negative poles.

Quality of a current refers to the smoothness or harshness or to the rapidity or slowness of interruption.

Resistance—Is the quality of a conductor which impedes the action of the current.

Reophore—An electrode.

Rheotome—A current breaker.

Stabile Application—Where the electrodes are kept in fixed position.

Tension, or Potential—Is that quality of electricity by which it overcomes Resistance.

Volt—The unit of Electro-Motive force.

## Galvanization of The Brain.

The Galvanic current only is of service in treating the brain. The current may be passed transversely through the brain. The electrodes should be from one to one and a half inches in diameter.

The current may also be passed longitudinally through

the brain. If the positive pole be applied to the back of the neck and the negative pole applied to the forehead, the flow of blood to the head will be increased.

If the position of the poles be reversed the supply of blood will be diminished.

Treatments should not be continued more than from three to five minutes. Mild currents only must be used. The current should not be interrupted or reversed.

Galvanization of the brain is indicated in various cerebral and nervous diseases among which may be mentioned headache, insomnia, melancholia, exhaustion, cerebral hyperaemia and anaemia, hemiplegia of cerebral origin, epilepsy, insanity, etc. In some cases lesions, effusions, infiltrations, etc., are materially benefited.

### **Central Galvanization.**

By this term we mean a treatment with the Galvanic current which will bring the entire central nervous system—the brain, sympathetic, and spinal cord—under the direct influence of the Galvanic current. This treatment is given by having one pole, usually the negative, at the epigastrium and the other at the vertex, or passed over the forehead, down the back of the neck and down the entire length of the

spine. Having the negative pole at the epigastrium and the positive at the base of the brain and down the sides of the neck is the best method of stimulating the sympathetic, pneumogastric, and phrenic nerves.

Avoid sudden interruptions of the current.

Mild currents must be used. One to four cells or one to five milliamperes will be sufficient through the head. Down the spine the strength of current may be increased. Seances should be brief—three to ten minutes.

Central Galvanization is one of the most valuable treatments in nearly all diseases of the nervous system.

### **Galvano-Puncture.**

The use of the needle is frequently necessary in treating Epithelioma, Hydrocele, some cases of Goitre and other tumors. The negative pole must be used. From four to eight cells or from ten to fifty milliamperes are sufficient except in large tumors. The positive electrode should cover a large surface upon some indifferent part. The current strength should be gradually increased, carefully avoiding interruptions and reversals of the current. Treatment should not be continued more than two to four minutes and should not be repeated more than two to four times weekly.

## Cataphoresis.

By Cataphoresis or Cataphoric Medication is meant the introduction into the body of medicaments by the aid of the Galvanic current. It has been found that many medicines, particularly those containing alcohol, ether or chloroform, will permeate the skin or mucous membranes much more readily when aided by the Galvanic current. The direction of osmotic action is from the positive to the negative pole. If the positive sponge of a Galvanic battery be saturated with some volatile preparation and the current be completed the medicament will travel through the tissues beneath the skin with the current, to a considerable extent.

Cataphoric medication has practically been used but little and mostly to produce local anaesthesia or to assist in dispersing tumors.

In several cases of Neuralgia relief has been obtained by using cocaine or aconite or both in this method where the current alone would not relieve.

In many cases of tumors, glandular swellings, various skin diseases and syphilis some of the iodide or lithia preparations and the bichloride of mercury have been used with



good results, making applications through the aid of the galvanic current.

In using iodine it should be applied with the negative electrode, as it will be drawn toward the positive pole even against the action of the current.

### **General Faradization.**

General Faradization, as its name implies, is general use of the Faradic current. The treatment has a direct influence upon the entire system and by reflex action may indirectly have a therapeutic effect on some particular organ or part which may be diseased. General Faradization is indicated wherever a general constitutional tonic influence is called for, in conditions of depressed vitality, in tedious periods of convalescence, wherever there is poor circulation, defective assimilation and in nearly all nervous conditions.

General Faradization is given by placing one electrode—usually the negative—at the lumbar plexus of nerves, or upon the sternum, or at the feet—preferably the latter—and passing the other electrode all over the surface of the body.

It is best to begin treatment of General Faradization with the positive pole at the base of the brain, pass it slowly down the spinal cord for three to five minutes, then pass it

over the chest and hold over the epigastrium for a few minutes to influence the coeliac-plexus, then over the abdomen to stimulate intestinal action and the abdominal muscles, then upon the thighs, arms, and legs, varying the strength of current to suit the resistance offered by the different parts.

In giving Faradization it is important that treatment should not be neglected at the back of the head, down the neck, the upper portion of the spinal column, and over the cilio-spinal center. The most important nerves of the body can be treated here. The length of treatment should be from fifteen to twenty minutes, and may be given every day or every other day.\*

## **Condensed Facts For The General Practitioner Who Uses Electricity.**

Good results cannot be secured with a poor battery or improper methods of application. A Faradic battery having a small coil of coarse wire produces a crude, harsh current lacking power of penetration and will invariably irritate a

\*NOTE—The treatments known as General Faradization and Central Galvanization were elaborated and brought to the notice of the medical profession by Beard and Rockwell.

nervous patient.

Poor connections of conducting cords and electrodes produce frequent shocks by breaking the current.

The electrodes should always be in position before the current is turned on.

Mild currents only should be applied to sensitive parts.

Conducting cords should be properly insulated. An uninsulated wire upon the flesh produces a painful, stinging sensation.

The battery should be in a condition to run continually during treatment.

Mild currents frequently repeated are preferable to strong currents at longer intervals.

The best method of lessening irritability with the Faradic current is to begin with a very mild current, gradually increase it to the highest point that does not produce pain, and after holding in position for a few moments gradually reduce the strength of current.

In internal local faradization the primary current acts with greater vigor than the secondary.

The Faradic current acts more markedly upon the muscular system and the Galvanic current upon the nervous system.

The primary coil gives more a current of quantity and produces more violent muscular contractions, but lacks the penetrating power of the secondary current.

The secondary coil produces a greater sedative effect and is a current of greater tension and penetrating power, hence more applicable to nervous and deeply seated diseases than the primary current. The finer and longer the wire in the secondary coil, the greater power of penetration and sedation.

It is not as important in using the Faradic current that attention be paid to polarity, yet it is always advisable to use the positive for the active pole when a sedative effect is desired and the negative for the active pole when a stimulating or irritating effect is desired.

Shocks should be avoided. Gradually increase and decrease the current, no matter which current is being used.

Either Faradic or Galvanic current will stimulate the circulation and improve nutrition.

The Galvanic current must be used where it is desired to produce electrolysis or any noticeable chemical effect.

The Galvanic current will stimulate the absorbents more powerfully than the Faradic current and is the current to use in removing hypertrophies, morbid growths, effusions, etc.

The rheostat and milliampere-meter should always be used with the galvanic current.

The Electro-Thermal Bath is a very excellent method of applying general faradization and may be used in any case where this treatment is to be given. The vapor bath of itself is frequently a valuable auxiliary to the electrical treatment.

With the galvanic current the stabile application of the positive pole is the most effectual method of diminishing irritability.

The best method of irritation is by rapid change of polarity.

The positive pole has a greater contracting power upon unstriped muscular fibers than the negative pole.

The Galvanic current operates more powerfully by reflex action than the Faradic on account of its continually flowing in one direction.

Both currents and either pole have a great influence upon nutrition.

In voluntary muscles, contractions are produced immediately upon applying current and at the end of treatment they immediately return to their normal condition.

In involuntary muscular fibers, as in the intestines,

stomach, oesophagus, etc., contractions are immediately started upon application of the circuit, but the movement when once induced will continue for a considerable time after cessation of the treatment.

Frequent interruptions of the current or changes of polarity intensify the effect of the current and are often necessary to relax tense muscles, etc.

Galvanization of the sympathetic influences the vaso-motor and trophic processes of the brain and spinal cord, the face, eyes, muscles, skin and many parts of the body.

It is frequently advisable, in addition to treating the diseased part itself, to apply the treatment to adjacent parts to act indirectly upon the circulation and nutrition of the diseased part.

Electricity is a tonic of great efficacy and useful in a wide range of cases, sub-acute or chronic, where a stimulating or tonic effect is desired.

Electricity sets in motion forces that continue to act for hours and even days after treatment, hence treatment should not be given too frequently. Nervous diseases in particular may be aggravated by too frequent treatments. Ordinary chronic cases require three or four treatments weekly. Acute or sub-acute cases may require daily treatment. Noth-

ing will be gained by treating cases more than once daily.

In chronic cases it is necessary occasionally to vary the treatment. Where general faradization has accomplished all that it will, general galvanization may produce still further results. Central or general galvanization may fail in a case where general faradization would produce prompt results and effect a cure.

It is frequently advisable to combine or alternate the treatments of general faradization or central galvanization upon the same patient.

Remember that it is through the process of nutrition that the majority of chronic cases are cured.

There is scarcely a chronic disease treated with electricity where we cannot trace at least a part of the good results of treatment to the results of nutrition. In the treatment of almost any chronic disease always remember that electricity properly applied will stimulate the circulation, and that the increased flow of blood will bring an increased amount of nutrition; that the contractions of muscular tissue produces the same effect as massage or gentle exercise; that nutrition may be affected through a chemical process; that the process of waste and repair may be promoted, and that the nutrition of the entire system may be improved through reflex

action as well as by the direct effect of treatment, securing a constitutional, tonic, stimulating effect.

Brief and plain directions will be given here for the treatment of the majority of diseases where electricity may be used to good advantage.

If the foregoing pages of this book have been read and are understood these directions for treating individual forms of disease may be followed with assurance of success.

ACNE.—Galvanic current is preferred. If case is acute use positive pole over affected part. If case is chronic use negative pole. Sponge electrodes, mild currents. Continue three to six minutes.

Use central galvanization as an auxiliary treatment.

The Faradic current is also beneficial to improve the circulation and nutrition.

ALOPECIA.—Galvanic current, negative pole applied to head, mild currents, five to ten minutes, sponge or wire brush electrode; or use the Faradic current, primary coil, negative pole. If root of hair is destroyed, of course, no treatment will benefit.

AMENORRHEA.—Galvanic current, negative pole (sponge) over ovary external, or vaginal electrode inserted as far as possible in vagina. Positive pole (large) upon



lumbar nerves. Moderately strong currents four to seven cells or as strong as patient can take without pain.

Length of treatment eight to ten minutes. Use general faradization or central galvanization as an auxiliary treatment.

External treatment is frequently sufficient.

Faradic current will cure many cases. Make applications as above, using primary coil and negative pole.

ANAESTHESIA (Local).—Faradic current, primary coil, negative pole, sponge or wire brush electrode. Use as strong a current as possible for five or ten minutes. Use general faradization as auxiliary treatment. The Galvanic current negative pole is also beneficial.

APHONIA.—Faradic current, primary coil, positive pole to muscles of neck, negative pole at seventh cervical vertebrae. Sponge electrodes, medium strength of current three to five minutes. If external treatment is not sufficient use laryngeal electrode with the other pole applied to muscles of neck. The Galvanic current is also of service, especially in treating the nerves supplying the parts.

ASPHYXIA.—Faradic current, primary coil, sponge electrodes, positive pole on epigastrium, negative pole over phrenic nerves. Use a powerful current twenty to thirty

minutes. The interrupted Galvanic current may be needed in severe cases.

**ASTHMA.**—Galvanize the pneumogastric nerves, positive pole, negative pole at epigastrium and use the Faradic current, secondary coil, one pole at neck; the other over cardiac region. Use medium strength of current ten to twelve minutes.

**BURNS.**—Use Galvanic current, positive pole, mild current five to ten minutes.

**CATARRH (Nasal).**—Galvanic current, sponge and nasal electrodes, positive pole at base of brain, negative pole in nostrils. Use a mild current two to four minutes.

**CHOREA.**—Galvanic current, positive pole down spinal cord, negative pole at epigastrium or at feet. Use a medium strength of current five to ten minutes. Employ general faradization, with secondary coil, on alternate days. Avoid interruptions or reversals of the galvanic current.

**COLDNESS OF EXTREMITIES.**—Faradic current, either coil, one pole passed over entire body, the other at feet. Use a strong current ten to twenty minutes. Galvanic current also beneficial.

**CONSTIPATION.**—Either current, positive pole over abdomen, negative pole at anus. Use strong currents ten

to twelve minutes. In chronic cases insert rectal electrode. General faradization and central galvanization are good auxiliary treatments.

DEAFNESS.—When caused by paralysis of nerves or chronic thickening of tympanium use Galvanic current, negative pole in ear, mild currents three to five minutes.

DEBILITY (General).—General faradization, secondary coil, medium current fifteen to twenty minutes and central galvanization eight to ten minutes on alternate days.

DYSMENORRHOEA.—Galvanic current, positive pole at lumbar nerves and over abdomen; negative pole at cervix or in vagina. Use medium current five to ten minutes. Faradic current will also relieve. Secondary coil.

DYSPEPSIA.—Galvanize the pneumogastric nerve. Use Central galvanization and general faradization, secondary coil. Moderate currents eight to ten minutes.

EARACHE.—Galvanic current, positive pole in ear, mild current two to four minutes.

ECZEMA.—Either current. Negative pole over parts affected. Use a medium strength of current five to ten minutes. Use central galvanization as an auxiliary treatment.

EPILEPSY.—Galvanic current, positive pole down spine, negative pole at epigastrium or at feet. Use medium

strength of current eight to ten minutes. Avoid interruptions of the current. Use general faradization with secondary coil as auxiliary treatment.

ENDOMETRITIS.—Galvanic current, positive pole (large) upon abdomen, negative pole (uterine electrode) in uterus. Use a medium strength of current five to eight minutes. When hemorrhage is present reverse position of the poles. Faradic current is of some service.

GLANDS (Enlarged).—Galvanic current, negative pole applied over gland. Positive pole in such position as to carry current through the gland. Use strong currents five to ten minutes. Cataphoric transmission of iodine (applied to negative pole) will aid.

GOITRE.—Same as above. In very bad cases galvanopuncture may be used.

HEADACHE.—Galvanic current, positive pole over seat of pain, negative pole at base of brain or in hands. Use mild currents two to four minutes.

HEMORRHOIDS.—Galvanic current, positive pole (needle electrode) inserted in the hemorrhoid, negative pole upon the sacrum. Use a medium strength of current two to five minutes.

HEMIPLEGIA.—Same general treatment as for Paraplegia, which see.

HERPES.—Galvanic current, positive pole over lesion, negative pole indifferent. Use medium strength of current five to ten minutes. Use local faradization as an auxiliary treatment.

In chronic cases use negative pole over affected part.

HEMORRHAGE.—Use positive pole, Galvanic current or positive pole of primary faradic medium current.

HICCUGH.—Either current, positive pole at epigastrium or along attachment of diaphragm, negative pole at sternocleido-mastoid muscle.

Use strong currents five to ten minutes.

HYPOCHONDRIASIS AND MELANCHOLIA.—General faradization, secondary coil, medium current fifteen to twenty minutes and central galvanization on alternate days for ten to twelve minutes.

IMPOTENCE.—Spinal galvanization, mild currents three times weekly. Faradic current down spermatic cord and spine and over abdomen and testicles. Use a medium strength of current eight to ten minutes. Employ general faradization as an auxiliary treatment. If parts are cold and flaccid use faradic current and wire brush electrode.

INCONTINENCE OF URINE.—Spinal galvanization with medium descending current. Use Faradic current secondary coil, five minutes, one pole at symphysis pubis and the other at lumbar nerves.

In chronic cases use negative pole of galvanic current in urethra (urethral electrode) with positive pole at lumbar nerves or at symphysis pubis.

INTESTINAL OBSTRUCTION.—Faradic current, primary coil, positive pole (large electrode) upon abdomen over colon; negative pole in rectum up against obstruction, if possible. Use strong currents ten to twenty minutes if necessary.

The Interrupted Galvanic current is also of service.

INSANITY.—Galvanization of brain and spinal galvanization. Medium current. Use general faradization as an auxiliary treatment.

INFLAMMATION.—Galvanic current, positive pole over affected part, negative pole indifferent. Use a medium current three to eight minutes. The faradic current, either coil, is also beneficial.

INSOMNIA.—Central galvanization and general faradization. Moderately strong current ten to twenty minutes.

JOINTS (Enlarged).—Galvanic current, one pole upon

either side of joint, strong currents and occasional change of polarity. Ten to fifteen minutes.

JOINTS (Sprained).—Either current. Positive pole upon the affected part, negative pole at some indifferent point. Use medium current five to ten minutes.

LEUCORRHOEA.—Faradic current, primary coil, positive pole at lumbar nerves, negative pole (vaginal electrode) in vagina. Use a moderately strong current five to ten minutes. Galvanic current, negative pole also of service.

Use intra-uterine electrode in uterine leucorrhoea.

LOCOMOTOR ATAXIA.—Spinal galvanization with negative pole, strong currents, ten minutes. Also treat lower extremities with negative galvanic ten minutes; and give general faradization as an auxiliary treatment. Few, if any, cases will be cured, but many cases may be greatly benefited.

MARASMUS.—Either current, general treatment with negative pole, medium currents ten to fifteen minutes. Also use central galvanization.

MENORRHAGIA AND METRORRHAGIA.—Faradic current, primary coil, positive pole in uterus, negative pole at lumbar nerves. Use a strong current ten to fifteen minutes.

The Galvanic current; same position of electrodes will also relieve.

MUSCULAR ATROPHY.—Faradic current, primary coil, negative pole over affected parts. Use sponge, or preferably wire brush electrode ten to fifteen minutes. Employ spinal galvanization as an auxiliary treatment.

The Galvanic current, negative pole, moderate current, used locally, will also assist in cure.

MUSCULAR CICATRICES AND CONTRACTURES.—Galvanic current, negative pole over affected part, strong current for five to ten minutes.

NAEVUS.—Galvanic current, negative pole (needle electrode) inserted in affected part, positive pole (sponge electrode) at some indifferent point. Use a mild current one-half to one minute. Insert needle in different places. Only small naevi can be successfully treated.

NEURALGIA.—Galvanic current, positive pole, sponge electrode, over seat of pain. Use a mild current two to five minutes. Avoid interruptions of the current. General faradization is a good auxiliary treatment. The secondary faradic current will frequently relieve Neuralgia promptly.

NEURASTHENIA.—Galvanic current, positive pole



down spinal cord, negative pole at epigastrium or feet. Use mild current for eight to ten minutes. Give general faradization—secondary coil—on alternate days. Sponge electrodes.

Galvanization of the brain will aid.

OVARALGIA.—Galvanic current, positive pole over ovary or in vagina, negative pole upon thigh. Medium strength of current five to ten minutes. Sponge electrodes.

Faradic current, secondary coil, also of service.

OVARITIS.—Same treatment as for Ovaralgia.

PARAPLEGIA.—Faradic current, primary coil, negative pole applied to parts affected. Large electrodes (sponge), positive pole indifferent. Strong currents fifteen to twenty minutes. Spinal galvanization should also be used.

The Interrupted Galvanic current also beneficial over parts affected.

PERITONITIS (Chronic).—Galvanic current, positive pole at lumbar nerves, negative pole (large) over abdomen. Use a strong current ten to twelve minutes.

PROLAPSUS-UTERI.—Faradic current primary coil, positive pole at lumbar nerves or over abdomen, negative pole (uterine electrode) at cervix. Use strong current five to ten minutes.

Galvanization of the spinal cord (descending current) will aid. Interrupted galvanic current beneficial for the local treatment.

PROSTRATE (Enlarged).—Galvanic current, negative pole applied to gland (external in mild cases) either in rectum or prostatic portion of the urethra. Positive pole upon thigh or any good indifferent point. Moderately strong currents five to ten minutes.

RHEUMATISM (Acute).—Faradic current. One pole over affected parts, the other pole indifferent. Use a strong current for ten to twelve minutes. Galvanic current, positive pole, will also relieve. Also use general faradization.

In chronic Rheumatism use Galvanic current and if pain and inflammation is absent use negative pole, strong current five to ten minutes.

SEMINAL EMISSIONS, SPERMATORRHOEA.—Faradic current, primary coil, positive pole down spermatic cord and spine; negative pole at perinaeum. Use a medium strength of current five to eight minutes and employ central galvanization and general faradization for their constitutional effects.

In obstinate cases use negative pole of mild Galvanic

current in urethra (prostatic portion), positive pole at lumbar nerves, two to five milliamperes three to five minutes.

These treatments should not be given more frequently than twice a week.

SPINAL DISEASE.—In acute cases where congestion or inflammation or irritation is present use the Galvanic current, positive pole down spinal cord and negative pole at feet. Employ a medium strength of current for eight to ten minutes.

In chronic cases, where atrophy, or thickening or paralysis is present reverse the polarity, using negative pole down spine and positive pole at feet.

SUPERFLOUS HAIRS.—Galvanic current, negative pole (needle electrode) inserted in hair papilla; positive pole (sponge electrode) in patient's hand. Use weak current, two to five cells about ten seconds. Do not remove too many hairs close together at one sitting.

TUMORS.—All non-malignant Tumors are treated in much the same manner. Galvanic current, negative pole over tumor, positive pole in such position current will pass through tumor. Use strong current five to fifteen minutes three or four times weekly. Cataphoric transmission of iodine (applied to negative pole) will aid. In some instances

Galvano-puncture will be necessary.

In Fibroid Tumors use very large electrode over abdomen for indifferent electrode and employ from 75 to 150 milliamperes of current. If hemorrhage is present use positive pole as active pole, otherwise negative will be active. Fibroid Tumors should not be treated more than twice weekly. Seances five to fifteen minutes.

URETHRAL HYPERAETHESIA.—Either current will benefit. Faradic current, secondary coil, one pole upon thigh, the other attached to steel sound or urethral electrode inserted in urethra. Use mild current five to eight minutes. If Galvanic current is used employ negative pole in urethra, four to eight cells. Five to eight minutes three times weekly. Spinal galvanization will aid.

URETHRA STRICTURE.—Galvanic current, negative pole (urethral electrode) in urethra, positive pole upon thigh. Use as strong current as patient can take without pain, eight to ten minutes. One treatment per week is usually sufficient.

UTERUS (Atrophy of).—Faradic current, primary coil, positive pole at lumbar nerves, negative pole (uterine electrode) at cervix or in uterus. Use a strong current ten to twelve minutes.

In very chronic cases the Galvanic current, negative pole intra uterine may be necessary.

UTERUS (Anteflexion of).—Faradic current, positive pole (uterine electrode) in uterus; negative pole (rectal electrode) in rectum against posterior wall of uterus. Use moderately strong current five to ten minutes.

UTERUS (Retro-Flexion of).—Same directions as in Anteflexion except that negative pole (urethral electrode) is inserted in bladder instead of the rectum.

UTERUS (Enlargement of).—Galvanic current, positive pole at lumbar nerves, negative pole (uterine electrode) at cervix or in uterus. Use medium strength of current five to ten minutes.

UTERUS (Sub-involution of).—Faradic current, primary coil, positive pole at lumbar plexus, negative pole (uterine electrode) in uterus. Use a strong current ten to fifteen minutes.

## Static Electricity.

Static Electricity is used as a therapeutic agent by the general practitioner comparatively but little, partly owing to

the expense of a serviceable static machine and perhaps still more to the fact that static electricity has not received the attention in our medical journals and medical colleges that the Galvanic and Faradic currents have received.

Static electricity has characteristics and advantages that should be understood by every practitioner who desires to make use of electricity in any of its forms.

While static electricity is not called for as frequently as the use of the Galvanic and Faradic currents, yet there are occasions where it is greatly to be preferred. Nearly every physician has seen a static machine and must have at least seen cuts of them which will give a better idea of their construction than any pen picture.

In the Galvanic or Faradic currents the electricity is generated in cells, with which all physicians are familiar, while in the static machine the current is generated by friction.

We will not in this work enter into the construction of the static machine, but would refer those physicians who are not familiar with its mechanism to an encyclopedia or a catalogue of electro-therapeutic appliances which will give accurate descriptions and cuts of the various machines.

The methods of applying static electricity are the following:

Static Insulation.

The Static Breeze.

The Static Induced Current.

The Direct and Indirect Spark.

STATIC INSULATION is one of the most agreeable methods of applying electricity. The patient is placed upon an insulated platform to which is attached one pole of the machine. The other is grounded by allowing the conducting cord or chain to rest upon the floor.

Upon the machine being put in motion the patient experiences a pleasant tingling sensation and frequently gentle perspiration is started. The treatment produces no pain or shock.

Static Insulation produces a general tonic effect, also a sedative effect upon the nervous system. This is the preferable treatment to give in cases of Neurasthenia, Chorea, Insomnia, and nearly all nervous diseases.

Static insulation is given by many physicians in preference to "General Faradization" or "General Galvanization." In many cases at least it will accomplish the same results and its application is much more pleasant and less trouble-

some to the patient, as no clothing has to be removed.

THE STATIC BREEZE is, like static insulation, a very agreeable treatment. The patient is again placed upon the insulated platform (so as to retain a charge of electricity) to which is attached one pole of the machine. The other pole communicates with a metal crown or cap studded with points which is placed a few inches above the head. Some physicians claim the positive pole in this treatment is more sedative and the negative pole more stimulating.

In Neuralgia of the face or head the static breeze will almost always give prompt relief. It is one of the very best treatments in obstinate cases of insomnia. It is also of service in some cases of Epilepsy, Insanity, etc.

THE STATIC INDUCED CURRENT corresponds very closely to the Faradic current. To produce the static induced current it is necessary to attach a pair of leyden jars to the arms of the machine. The larger the jars the more powerful the effect of current, hence two or three sets of jars are frequently employed.

In this treatment it is not necessary for the patient to be placed upon an insulated platform. One end of the cords or wires must be attached to the outer coating of the tin foil on the leyden jars.



The other end of the conducting cords are attached to electrodes and these applied to any part of the body. The poles of the machine must be brought near together (not touching) before the machine is started. Separating the poles increases the effect of the treatment and must be done very carefully or too powerful an effect will be produced. The sensation and effect produced by the static induced current are almost exactly the same as those of the Faradic current.

In the static induced current there is a much greater electro-motive force and fixed polarity. The static induced current may be used wherever the Faradic current would ordinarily be employed and is probably the most powerful tonic of the two.

THE STATIC SPARK is given by placing the patient upon the insulated platform, to which one pole of the machine is attached while the other is brought to bear upon the parts to be treated. The electrode should be held near to, but not touching, the clothing directly over the part to be treated. The greater the distance the poles of the machine are apart the more severe is the effect.

More rapid revolutions of the plates will also increase the effect of the spark.

Static sparks are of very great service in treating Contracted Muscles, Muscular Atrophy, Muscular Spasm, some forms of severe Neuralgia, various forms of Paralysis, Chronic Synovitis, etc.

The treatment of static insulation and static sparks given at the same seance produce very pleasant results in a large range of cases.

In using static electricity the subject of polarity is not considered except by a very few who claim to be able to produce different results with the two poles.

This has not been the experience of the writer and it is generally admitted that the same effect may be produced by either pole.

The polarity of the static machine frequently changes and what is the positive pole during one treatment may be the negative pole during the next treatment.

Static electricity does not produce any of the chemical effects which are obtained through the Galvanic current and in electro-therapeutics many things may be accomplished through the chemical effects of the Galvanic current that would be impossible with the static machine. Static electricity possesses very small amperage or quantity but very great voltage or intensity. As previously stated,

however, much, if not all, of the work usually accomplished with the Faradic current might be performed with static electricity.

The principal advantages in the use of the static machine over the Faradic current are that we have a much greater electro-motive force and that the patient has to remove no clothing.

Cases of Hysteria, Neurathenia, Insomnia, Chorea, Melancholia, Hporchondriasis, and other allied diseases, will receive greater and more prompt benefit from static electricity than perhaps from any other treatment.

While static electricity produces no chemical effect in the tissues, it will increase the circulation, improve nutrition, assist digestion and assimilation, promote absorbtion, and quiet, refresh and invigorate the nervous system.

The following text books of Electro-Therapeutics are recommended:

The International System of Electro-Therapeutics,—  
Medical and Surgical Electricity. Rockwell.

Electricity in Medicine and Surgery. St. Clair.

Static Electricity. Monell.





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